

October 1970

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### Recommended Citation

William E. Thoms, *The Colorado River: Apportioning the Waters*, 47 Chi.-Kent L. Rev. 200 (1970).  
Available at: <https://scholarship.kentlaw.iit.edu/cklawreview/vol47/iss2/3>

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# THE COLORADO RIVER: APPORTIONING THE WATERS

WILLIAM E. THOMS\*

## I. A STATEMENT OF THE PROBLEM<sup>1</sup>

**T**HE ABSENCE of open conflict between the United States of America and the United Mexican States does not signify a total satisfaction on both sides. Sharing a continent with an industrial giant like the United States can be a source of discomfort since even the minor actions of the giant can produce strong repercussions in the neighboring land.

One problem which has always vexed Mexico is lack of water. In a nation largely dependent upon agriculture, deprived of its most fertile land as a result of the 1835-1848 wars, sufficient water for the use of farmers is a need of the first priority. Since Mexico has little arable land, the augmentation of this amount by irrigation has been an appealing solution. The same problem has been faced by the states of our arid Southwest.

The Colorado River is clearly the most important river in the area. It drains parts of seven states and flows into the Gulf of California, dividing the Mexican states of Sonora and Baja California.<sup>2</sup> The conflicting Mexican and American claims to the waters of the Colorado River and its tributaries are the subject of this article.

The first use of the water of the Colorado River for irrigation occurred in the Salton Sink of southern California and the adjacent area in Mexico, now known as the Imperial Valley. Although in 1905-1906 the Colorado River broke through the dams, wreaking incredible damage and creating the Salton Sea, eventually large quantities of water were productively used to raise cotton, oranges, lemons, and other tropical fruits which formerly had been imported. Thus irrigation produced lower prices and fuller employment. Others areas in the United States and Mexico have attempted to emulate the success of the Imperial Valley.

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<sup>1</sup> The author wishes to thank Dr. Samuel M. Savin of the Department of Geology, Case-Western Reserve University, for his assistance.

<sup>2</sup> Warne, *The Water Crisis is Present*, 9 Nat. Res. J. 58 (1969).

The Boulder Canyon Project<sup>3</sup> and subsequent improvement projects on the Colorado River by the United States were designed to bring fertility to and increase the productivity of the desert by diverting water from the Colorado River for purposes of irrigation to areas in southern California and Arizona. Mexico, as a co-riparian, demanded a guaranteed share of the waters for her northern states, especially the desert state of Sonora. A treaty between the two nations was signed in 1944, and proclaimed effective on November 27, 1945,<sup>4</sup> which guaranteed to Mexico a minimum of 1,500,000 acre-feet of water. This treaty is in force today. Exact quantitative limitations are placed on allowable diversions although they may not be enforced until shortages occur. The limitations are based on the quantity of water used for irrigation projects such as the Imperial Valley in 1929. However, water today is of a much lower quality than it was in 1929, and more water is required today to do the same job a smaller amount would do forty years ago. Although diversions from the upper Colorado River are of high quality, farther south the quality of water is worse. At the Imperial Dam, where water is diverted for the Yuma, Wellton-Mohawk and Gila projects and for the Imperial and Coachella Valleys, mineral content is frequently higher than maximum American limits for drinking water. Nonetheless, many residents of the area must drink such water.<sup>5</sup>

One advantage of the Colorado River improvement projects is that the once sporadic flow of the river is now controlled, producing a steady flow of water into Mexico. Relying on this steady flow of water, farmers have expanded irrigation throughout the state of Sonora, but often with disappointing results.

In moist temperate climates, the rate of evaporation is much lower than the rate of precipitation, therefore rain either runs along the ground to rivers or seeps into the ground to emerge in springs elsewhere. The water dissolves metals in the earth and carries those metals downstream. In a dry climate, however, the rate of evaporation is as great or greater than the rate of precipitation. Thus, little water leaves the dry areas in liquid form except during exceptional rainfall. The rain seeps into the desert soil, dissolves the minerals and then evaporates, leaving

<sup>3</sup> 45 Stat. 1057 (1928).

<sup>4</sup> 59 Stat. 1219 (1945).

<sup>5</sup> *Supra* n.2 at 58, 60.

the constituents to form alkali deposits, or caliche, either at the surface or just below the surface. For example, since Sonora is mostly desert, its soil has a very high alkaline content. Percolating ground water found there has high content of calcium, potassium, sodium and magnesium.

Irrigation greatly intensifies the problem of alkaline soil. Excessive water must be drained off or it will produce alkali deposits. Therefore, unless some suitable drainage system is provided, the farmland may be destroyed for any agricultural use. Also, the purer the water available for irrigation, the less likely is the possibility of alkali deposits developing. In California, excessive water is drained off from the Imperial Valley into the Salton Sea. In the Coachella Valley, farmland is interspersed with a network of underground drainage pipes to carry the water away.

Irrigation is a compromise between too much water in parts of the irrigation zone and too little in others. High entry rates of water into the soil make reasonable irrigation efficiency difficult to obtain. Where the soil is sandy, as in the arid regions of Mexico, little moisture is retained by the soil. The moisture which does remain in such soil is simply drained downward at a slower rate.<sup>6</sup>

The Colorado River Compact of 1922,<sup>7</sup> which apportioned the waters of the river among the seven states involved, said nothing about the quality of the water. On one occasion, when highly saline water was removed from the ground water basin under the Wellton-Mohawk Project in the lower Gila Valley, the saline water was pumped into the Colorado River below the Imperial Dam. As a result of this procedure, the quality of the water at the Morelos Dam in Mexico fell below the tolerable level for irrigation.<sup>8</sup> Thus large amounts of water are now necessary for leaching operations to bring the Mexican soil back up to tolerable saline levels.<sup>9</sup>

A temporary agreement to meet Mexican demands for a higher quality and quantity of water was reached in 1965, whereby the

<sup>6</sup> A. F. Pillsbury, *Observations on the Use of Irrigation Water in Coachella Valley, California*, Bulletin No. 649, Agriculture Experiment Station, University of California, Berkeley, 1941.

<sup>7</sup> H.R. Doc. No. 605, 67th Cong., 4th Sess. (1923).

<sup>8</sup> *Supra* n.2 at 59.

<sup>9</sup> 19 Stan. L. Rev. 406 (1967).

United States agreed to construct a drainage channel, known as the "Main Outlet Drain Extension," or "MODE," to by-pass the saline effluent around the Morelos Dam.<sup>10</sup> This channel was completed and in service by November 1965. Within the first two years of operation, the average salinity of the water was reduced from 1380 parts per million to 1210 parts per million. In the 1965 agreement, the United States carefully evaded the issue of quality and took the position that "MODE" was a gratuity. The United States emphasized that Mexico had no water rights other than those specified in the 1944 treaty. This settlement was admittedly temporary and expired in 1970, although the pumping of the ground water was not expected to be completed by the end of 1970. Furthermore, no provision was made for the extension of this corrective device.

In 1966, Mexico requested additional water from the Colorado River, in order to irrigate its agricultural lands in the Mexicali Valley effectively. The United States agreed to lend Mexico 40,535 acre-feet of Colorado River waters during September and December 1966. In return the United States was to retain 40,535 acre-feet from the Mexican quota in 1967. However, if the run-off of Colorado River waters in the United States exceeded 8,500,000 acre-feet, the water would be retained over a period of three years. Mexico was required to reimburse the United States for the decrease in power generation at the Hoover Dam or the Glen Canyon Power Plant.<sup>11</sup> In negotiations, the United States specifically stated:

This Agreement shall not be regarded as precedent for deliveries of water in the future in addition to the waters of the Colorado River allotted to Mexico annually under Article 10 of the 1944 Water Treaty.<sup>12</sup>

Another factor affecting the water problem of Mexico is the amount of water diverted for the use of large American cities. Such large metropolitan areas as Los Angeles-Long Beach (population 6,750,000), Las Vegas (236,000) and San Diego (1,200,000) rely upon the Colorado River for their municipal water supply. Although Article 3 of the 1944 Treaty provides that domestic and municipal use

<sup>10</sup> Minute 218, International Boundary and Water Commission, United States and Mexico (March 22, 1965).

<sup>11</sup> Agreement with Mexico concerning Boundary Waters: Loan of Waters of Colorado River, August 24, 1966, TIAS No. 6082.

<sup>12</sup> *Id.*

shall take precedence over agricultural use, apparently Mexico did not foresee the postwar growth of these large American urban areas and did not realize the implications of this provision.

The lowered quality of the Colorado River waters has been aggravated by misuse of irrigation techniques by Mexicans. Although Mexican farmers complain about the drainage water which salted their lands, investigators found that the Mexicans were not following safe irrigation practices within their area. They were spreading their water too thinly and not providing adequate drainage to maintain proper salt balance in the soils of the land they irrigated.<sup>13</sup> If less land were cultivated farmers could provide sufficient water per acre to create sufficient run-off to cleanse the land of alkali deposits. But, in a country newly-emerged from subsistence farming and suffering from lack of technical and agricultural education, this alternative may not be viable. Abandonment of the arid land as unsuitable for farming and concentration of Mexican resources elsewhere seems, to this writer, to be politically unfeasible.

## II. PERTINENT TREATIES

In comparison to the wealth of international law concerning admiralty, very little international law concerns riparian rights.<sup>14</sup> Nations generally develop treaties or other working arrangements with their neighbors concerning the use of common rivers.<sup>15</sup> Most of the law concerning rivers relates to navigation, which is irrelevant here.

The first treaty with Mexico affecting rivers was the Treaty of Guadalupe Hidalgo of 1848.<sup>16</sup> Besides acquiring portions of the Colorado and Rio Grande rivers, the United States secured navigation rights into and through the Gulf of California. The treaty forbade the United States from constructing any work that might impede or interrupt the navigation of the Gila and Rio Grande rivers below the Mexican boundary.

In 1906, a convention was convened regarding the water problems of the Rio Grande. The convention resulted in an agreement that the

<sup>13</sup> *Supra* n.2 at 59.

<sup>14</sup> Brierly, *The Law of Nations* 205 (5th ed. 1955).

<sup>15</sup> *Id.*

<sup>16</sup> Treaty of Peace, Friendship, Limits and Settlements with the Republic of Mexico, Feb. 2, 1848, 9 Stat. 922, T.S. No. 207, 1 Malloy 1111.

United States would deliver to Mexico 60,000 acre-feet of water annually from Elephant Butte Dam without charge to Mexico, but the agreement explicitly denied any United States recognition of Mexican claims to the water.<sup>17</sup> In 1908, the American and Mexican governments appointed joint commissions to study the water problems of the Colorado and Rio Grande rivers, but the Mexican revolution postponed further negotiations until 1925.<sup>18</sup>

In 1927, the International Water Commission was appointed by the American and Mexican governments. This commission failed to agree on a Colorado River treaty.<sup>19</sup> Further study was authorized by the United States Congress in 1935.<sup>20</sup> The American section of the International Water Commission was abolished and its functions transferred to the International Boundary Commission, which nine years later successfully concluded negotiations.<sup>21</sup>

In the original negotiations, the Mexicans demanded 3,600,000 acre-feet of water. The United States argued that delivery of that much water would prevent the development of American land for the sake of Mexican land that was not then, and might never be, irrigated.<sup>22</sup> Therefore, the United States offered 750,000 acre-feet for "reasons of comity." Finally, the figure of 1,500,000 acre-feet was adopted. The treaty lists the priority of water use as follows:

1. Municipal
2. Agricultural
3. Power
4. Other industrial uses
5. Navigation
6. Fishing<sup>23</sup>

By this treaty, the United States specifically recognized Mexico's right to the water of the Colorado River.<sup>24</sup> The treaty was approved by the United States Senate on April 8, 1945.

<sup>17</sup> Convention with Mexico, May 21, 1906, 34 Stat. 2953, T.S. No. 455, 1 Malloy 1206.

<sup>18</sup> Teclaff, *United States River Treaties*, 31 Ford. L. Rev. 710 (1963).

<sup>19</sup> *Id.*

<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> Art. 3, 59 Stat. 1225, T.S. No. 994.

<sup>24</sup> Art. 8, 59 Stat. 1231, T.S. No. 994.

The treaty concerns the Colorado, Rio Grande and Tijuana rivers. The Mexicans accepted this quota of water for the Colorado River only as part of a comprehensive arrangement which included regulation of American use of the boundary rivers as well. Secretary of the Interior Ickes described the treaty as magnanimous on our part.

On the Colorado River, we guarantee to Mexico about twice as much water as she was ever able to use before the Department of the Interior built and operated Boulder Dam and thereby evened out the flow of that river between flood and dry seasons. Yet the treaty does not make any charge to Mexico for the Boulder storage. . . . [W]e also agree to build Davis Dam below Boulder entirely at our own expense and without charge to Mexico for operation.<sup>25</sup>

By Article 10 of the treaty the United States guaranteed to Mexico a minimum of 1,500,000 acre-feet of water each year, to be delivered according to schedules furnished in advance by the Mexican side of the International Boundary Commission. When, in the judgment of the United States, a surplus of water exists, Article 15 stipulates that the United States will allocate to Mexico 200,000 additional acre-feet of water, bringing Mexico's total possible allotment to 1,700,000 acre-feet.<sup>26</sup> Mexico was permitted to use whatever additional water arrives at her diversion points, but no claim of ownership attached thereto.

Article 12 stipulates that Mexico must build at its own expense a main diversion structure (the Morelos Dam) in the Colorado River below the U.S.-Mexican boundary line and other necessary flood control projects. The treaty is regulated and implemented by the International Boundary and Water Commission. The Commission has investigative, administrative and arbitral powers. Its decisions are considered to be approved by both countries unless one of the governments disapproves of the Commission's action within thirty days.

Finally, the treaty provides that in case of drought or serious accident to the hydraulic works of the United States, that country may curtail its water delivery to Mexico in the same proportion as uses in the United States are reduced. Neither of these contingencies has yet occurred.

Subsequent agreements have been the 1965 Temporary Water

<sup>25</sup> 7 Foreign Relations of the United States 1360 (1944).

<sup>26</sup> Art. 15, 59 Stat. 1247, T.S. No. 994.



Purification Agreement<sup>27</sup> and the 1966 loan of Colorado River waters.<sup>28</sup> A new approach to the Mexican-American water problem was taken by the Multilateral Desalting Agreement signed at Washington October 7, 1965.<sup>29</sup> That agreement proposed a feasibility study of a dual-purpose nuclear power plant designed to produce fresh water and electricity for Sonora, Baja California, Arizona, and California. The study group includes a chairman and secretary from the International Atomic Energy Commission, four Mexican and four American members.

### III. RIGHTS UNDER INTERNATIONAL LAW

One of the difficulties in the application of international law to this Mexican-American water problem is the paucity of international law concerning rivers. Basically, the difficulty stems from the fact that the nations involved usually have reached some sort of settlement regarding the use of rivers through either war or treaty. Different views of the nature of ownership of resources between the common law system of the United States and the civil law system of Mexico complicate negotiations.

Not surprisingly, the United States' first approach to the Mexican-American water problem was a statement of absolute ownership. Judson Harmon, former Attorney General of the United States, stated in 1898: "International law imposes no obligations on the United States not to divert its waters on its territory to the detriment of other countries."<sup>30</sup> Mr. Harmon's opinion dealt with a navigation problem, not with the question of allocation of waters of international rivers.<sup>31</sup> The Harmon opinion has never been followed either by the United States or by any other country. A doctrine which permits any state to inflict irreparable injury upon its neighbor with no other restraint than the threat of war seems anarchic.<sup>32</sup> Former Secretary of State Acheson

<sup>27</sup> *Supra* n.11.

<sup>28</sup> *Supra* n.12.

<sup>29</sup> Agreement with Mexico and the International Atomic Energy Agency for a Preliminary Study of a Nuclear Electric Power and Desalting Plant, Oct. 7, 1965, T.I.A.S. No. 5874.

<sup>30</sup> Op. Atty. Gen. 274 (1898).

<sup>31</sup> Hearings before Committee on Foreign Relations on Treaty with Mexico Relating to Utilization of Water of Certain Rivers, 79th Cong. 1st Sess. pt. 5 at 1740-1741 (1945).

<sup>32</sup> Jiminez de Arechaga, *Normas Juridicas Internacionales Que Regulan El Aprovechamiento Hidraulico*, 2 Inter-Am. L. Rev. 317, 329.

referred to the Harmon doctrine as hardly the kind of theory that can be seriously urged in these times.<sup>33</sup>

At the opposite extreme from the Harmon doctrine is the theory of absolute territorial integrity, which permits the lower riparian to demand the continuation of the full flow of the stream from its upstream neighbor.<sup>34</sup> This theory, if accepted, would prevent all irrigation and therefore is unacceptable.

The most favored theory of riparian rights in Latin America is that of equitable apportionment, or limited sovereignty. Under this theory, a nation may make use of the water flowing through its territory insofar as it does not substantially interfere with the use by a co-riparian. Except by agreement between nations or by order of the World Court,<sup>35</sup> nations having part of an international watercourse under their jurisdiction are under a duty not to change the existing distribution of water to the disadvantage of co-riparians.

Two other theories which have found some acceptance, especially in Anglo-American countries, are that of "prior use" and "best use."<sup>36</sup> Under the "prior use" theory, the nation which has first used the water for some project has a right to water necessary for continuing that project. Under the "best use" theory, the nation which may use the water in the most beneficial way has a right to use the water. The disadvantage of the "best use" theory is that the result depends on the subjective values of the arbitrator.

If the question of Mexican demands for better and cleaner water were submitted to arbitration, this writer believes that most international arbitrators would prefer the equitable apportionment test. However, since the 1944 treaty is still in force, Mexico might be limited to the agreed-upon quantity of water, unless grave imbalance in bargaining ability can be shown. Nonetheless, the United States might be obligated by the arbitrators to furnish suitable water.

<sup>33</sup> *Id.*

<sup>34</sup> Wilson, *International Law* 110 (3d ed. 1939).

<sup>35</sup> See *Declaration of Seventh International Conference of American States*, Am. J. Int. Law. Supp. 60 (1934) and Inter-American Bar Association, 10th Conf. Resolution No. 4 (1957).

<sup>36</sup> *Supra* n.34 at 112.

## IV. CONCLUSION

Several changes in the Colorado River water problem have occurred since 1944. Mexico and many of our southwestern states are suffering from both insufficient and polluted water. The Colorado River water problem is but one aspect of the general water-pollution problem plaguing the rivers of North America. As environmental concerns become political issues, the special interests and objections of the sparsely populated southwestern states may be less influential in government policy.

Professor William E. Warne has suggested the following measures to ameliorate the water problems of the Colorado River:

1. Augmentation of the flow of the Colorado River with water of satisfactory quality. The Colorado could be supplemented by diversion from other watersheds that have ample supplies. Such suggestions are notoriously unpopular in the Pacific Northwest.
2. Desalinization (as is presently contemplated in the Multilateral Desalting Treaty of 1965) might provide such supplemental water. At present, desalinization costs are prohibitively high, but the future search for pure water might make desalinization practical.
3. Waste discharges must be cleaned up. Such a program, though politically palatable, is expensive and costs will continue to increase as waste discharges continue.<sup>37</sup>

An extension of the "MODE" project beyond 1970 or an exchange of excess Rio Grande water for Colorado River water might temporarily solve the problem of inadequate water.

From its recent actions the United States seems willing to alleviate the harm done by its pollutants to its neighbors. Domestic concern is now aroused against further despoiling of the environment. Prompt action by our country could be a way of demonstrating our good faith. The Treaty of 1944 is in need of revision by both parties. Both parties would retain more control over the outcome if they were to negotiate a

<sup>37</sup> *Supra* n.2 at 61.

water quality treaty, rather than leave that question in the hands of an outside and possibly hostile arbitrator.

Private riparian law in the United States seems recently to have become more conscious of the social responsibilities of the property owner. The distinctions between civil and common law appear to be less pronounced on this point. The solution to the Mexican-American water problem may well be political, depending on the priority the United States puts on good relations with Mexico and the priority Mexico places upon suitable water. Until the problem is alleviated, areas on the lower Colorado River are receiving less water than before, and of decidedly inferior quality.<sup>38</sup>

<sup>38</sup> The quantity and quality of Colorado River waters delivered to Mexico may well be affected by the construction of the Four Corners and five other huge coal-fired plants by a consortium of southwestern electric companies. The power plants' steam generators would utilize about 250,000 acre-feet of Colorado River water a year, thus cutting the river's flow and increasing its salinity content downstream. See TAME, June 7, 1971, at 61.